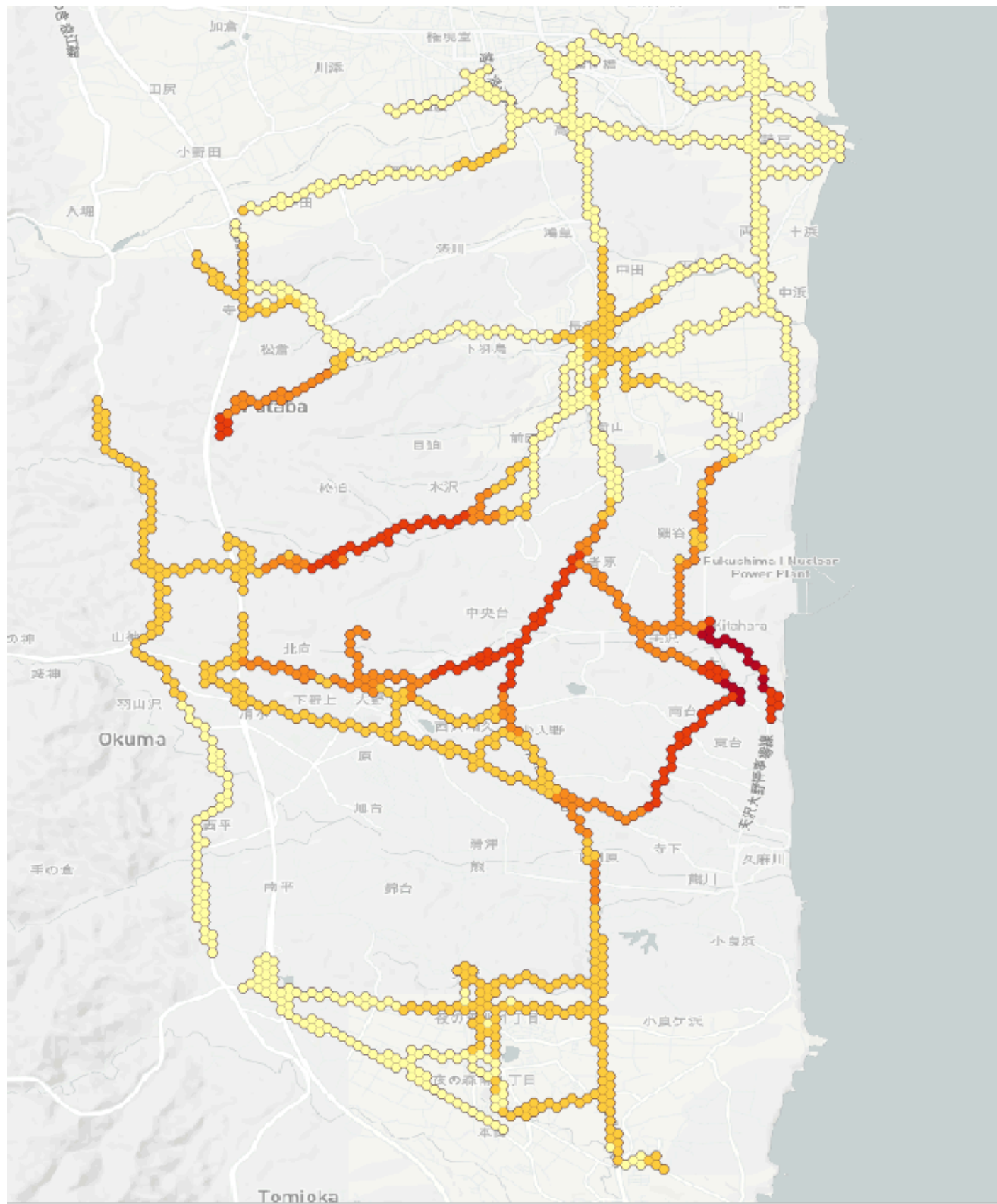


## Targeted skills

By the end of this module, you will know how to:

- create a grid of specified resolution and extent
- perform a spatial query (select grid cells containing measurements only)
- aggregating punctial data into grid cells (max, min, mean, ... value)
- create a choropleth map of aggregated measurement values



## Data

Data to be used in this module can be found in the following folders:

`data/agg_data`

## Exercise outline & memos

Our goal in that exercise is to aggregate measurements in a custom grid in order to overcome the issue of overplotting. In our case we will take the maximum value of measurements ‘covered’ by each specific grid cell.

### 1. Open shapefile & background map

Open:

`data/agg_data/safecast.shp`

and add a background map:

[In QGIS top menu]

Web   OpenLayers plugin   OpenStreetMap   OSM Humanitarian Data Model

### 2. Create a grid

Creating a grid (rectangle or hexagons) of specified resolution and extent can be done using basic QGIS install but in our case in order to simplify the process we will use MMQGIS plugin.

Install MMQGIS plugin

[In QGIS top menu]

MMQGIS   Create   Create Grid Layer

Fill MMQGIS grid dialog as below:

**Grid**

Shape Type  
Hexagons

X Spacing: 0.001    Y Spacing: 0.0011547010767    Units: Layer Units

Extent: Layer Extent    Layer: safecast

Top Y: 37.4959783333

Left Y: 140.943918333    Right Y: 141.041356667

Bottom Y: 37.34706

Output Shapefile: rses/gis/ictp/smr2858/exercises/grid.shp    Browse...

Cancel    OK

Save create grid as exercises/grid.shp

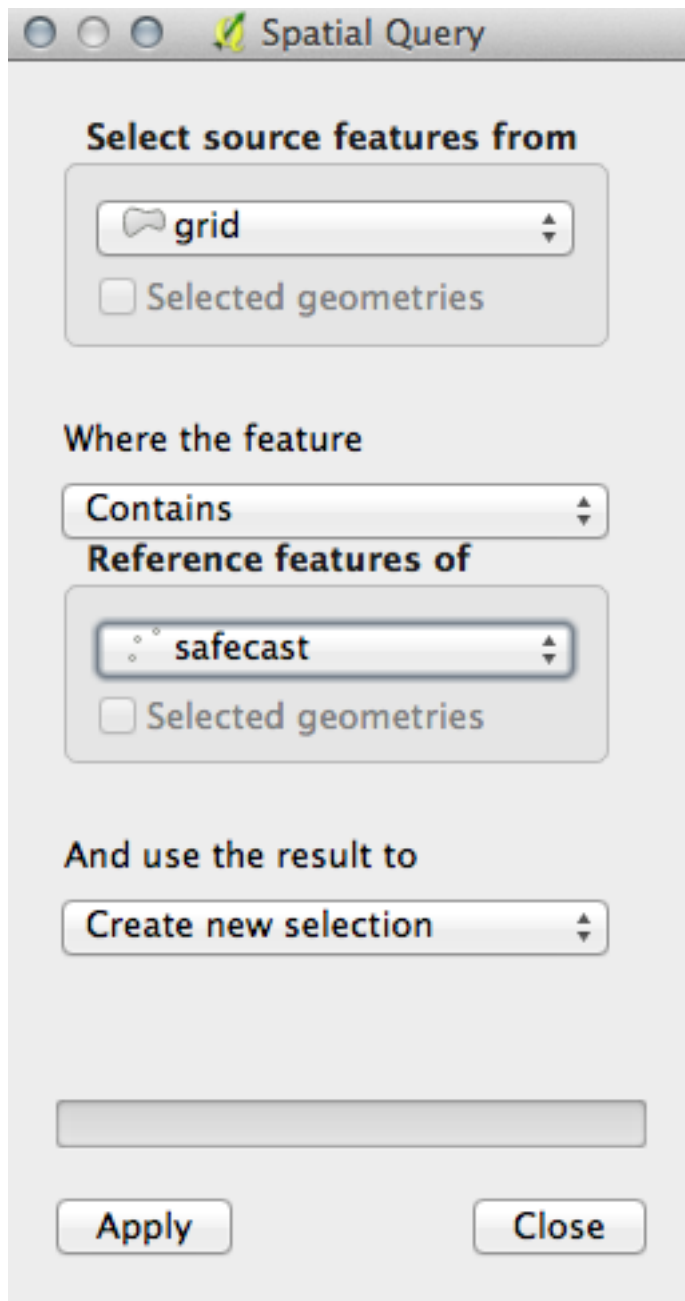
## 2. Spatial query

We will perform a simple spatial query allowing to select grid cells containing measurements only. To do so, you will need to install 'Spatial Query' plugin.


Install Spatial Query plugin

[In QGIS top menu]

Vector    Spatial Query    Spatial Query

The image shows a 'Spatial Query' dialog box with a title bar containing three window control buttons and a green checkmark icon. The dialog is organized into three main sections. The first section, 'Select source features from', contains a dropdown menu with a hexagon icon and the text 'grid', and an unchecked checkbox labeled 'Selected geometries'. The second section, 'Where the feature', contains a dropdown menu with the text 'Contains'. The third section, 'Reference features of', contains a dropdown menu with a hexagon icon and the text 'safecast', and an unchecked checkbox labeled 'Selected geometries'. Below these sections is a fourth section, 'And use the result to', containing a dropdown menu with the text 'Create new selection'. At the bottom of the dialog are two buttons: 'Apply' on the left and 'Close' on the right.

**Select source features from**


 grid

☐ Selected geometries

**Where the feature**

Contains

**Reference features of**

 safecast

☐ Selected geometries

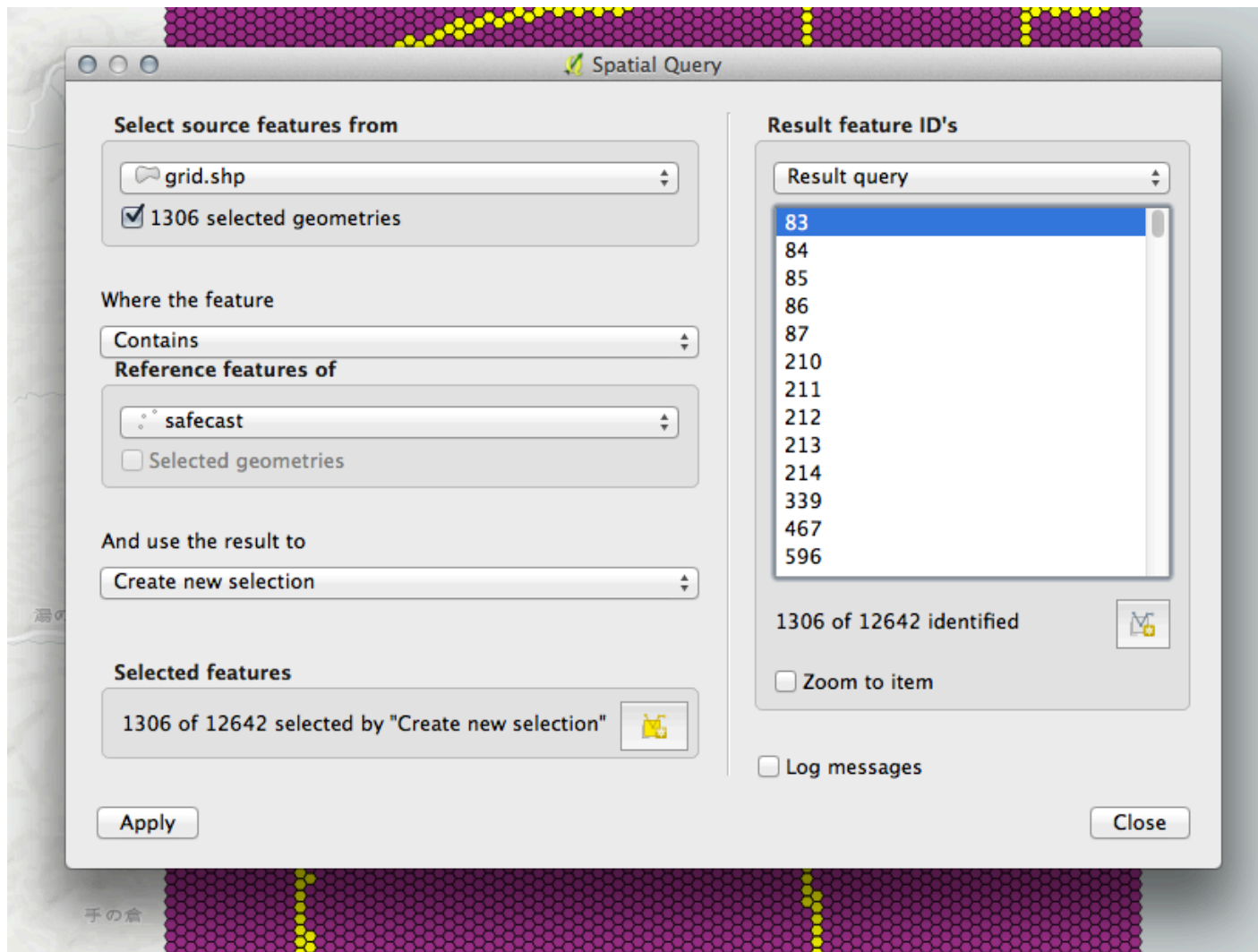
**And use the result to**

Create new selection

**Apply** **Close**

Click Apply

You should get another dialog listing all features (hexagons) selected. Notice as well that selected hexagons get highlighted in “yellow”.



You need to save the selection as a new layer now:

1. Click right on 'grid' layer
2. Save As 'exercises/grid\_selection.shp'
3. IMPORTANT: check 'Save only selected features' checkbox

### 3. Aggregate measurements in grid

Next step is to aggregate measurements (puncual data).

[In QGIS top menu]

Vector Analysis tools Points in Polygon ...

Count Points in Polygon

Input polygon vector layer  
grid\_selection

Input point vector layer  
safecast

Input point vector layer attributes to aggregate

id
latitude
longitude
value

Statistical method for attribute aggregation  
sum

Output count field name  
nb\_points

Output Shapefile  
is/ictp/smr2858/exercises/grid\_agg.shp

☒ Add result to canvas

Now, if you open the attribute table of the newly created grid (the aggregated one) you should have two new attributes: nb\_points and value\_sum (which contains the value of highest measurements 'contained' by the hexagon).

### 3. Thematic mapping

You are now in a position to perform a thematic analysis in the same spirit as in Thematic mapping of punctual data.

This is left as exercise ...